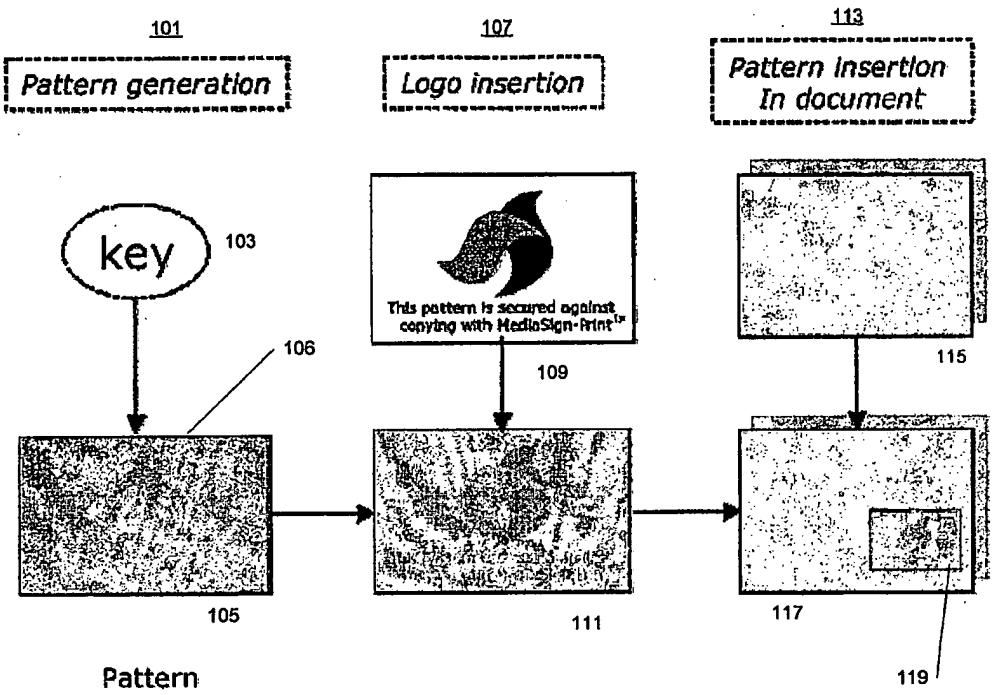

101
Pattern generation
107
Logo insertion
113
Pattern insertion In document
key
103
106
This pattern is secured against copying with MediaSign-Print™
109
115
105
111
117
119
Pattern

Fig. 1

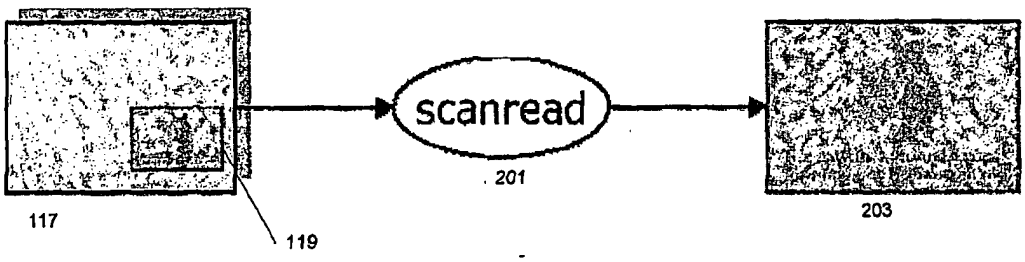


Fig. 2

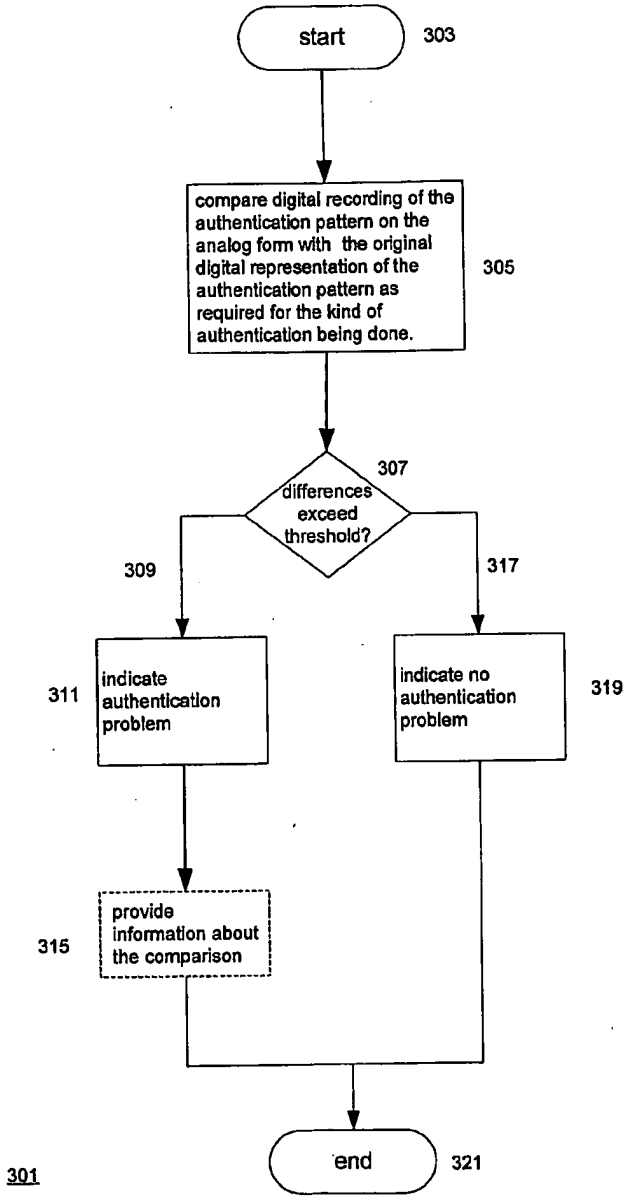
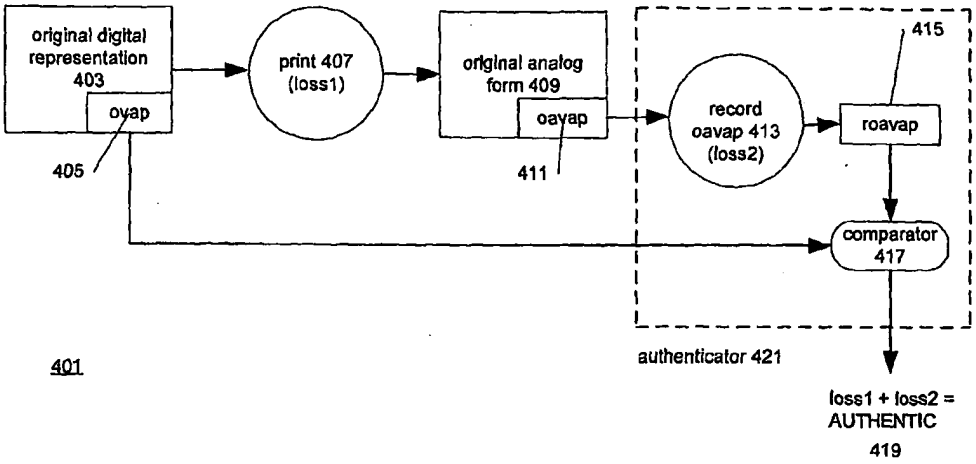

start
303
compare digital recording of the authentication pattern on the analog form with the original digital representation of the authentication pattern as required for the kind of authentication being done.
305
307
differences exceed threshold?
309
317
311
indicate authentication problem
indicate no authentication problem
319
315
provide information about the comparison
end
321
301

Fig. 3

Scenario 1: printing and authentication of an original analog form



Scenario 2: printing and authentication of a non-original analog form

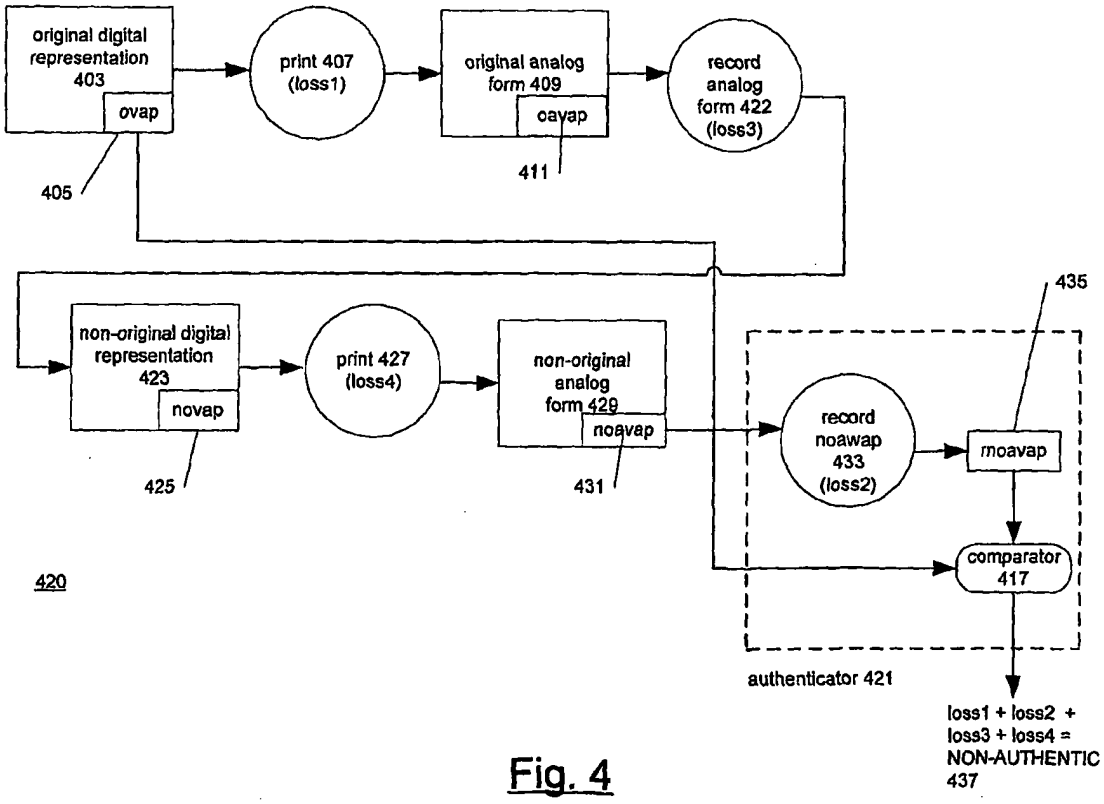
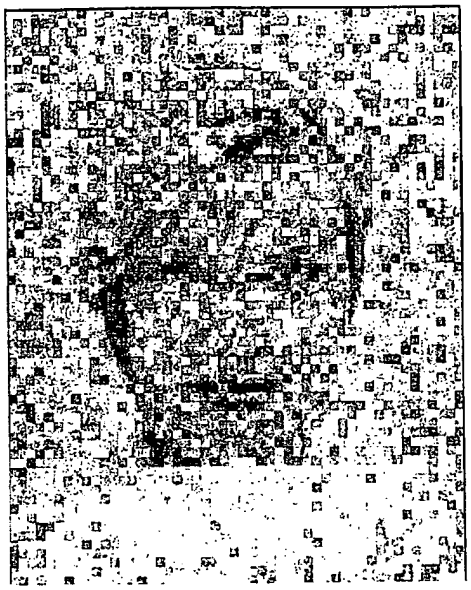
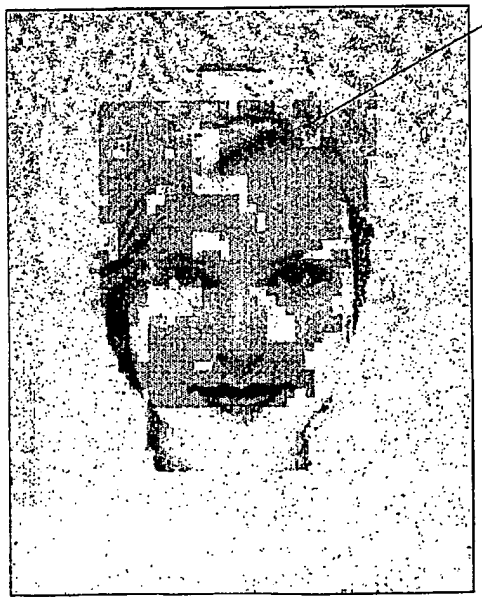


Fig. 4

501

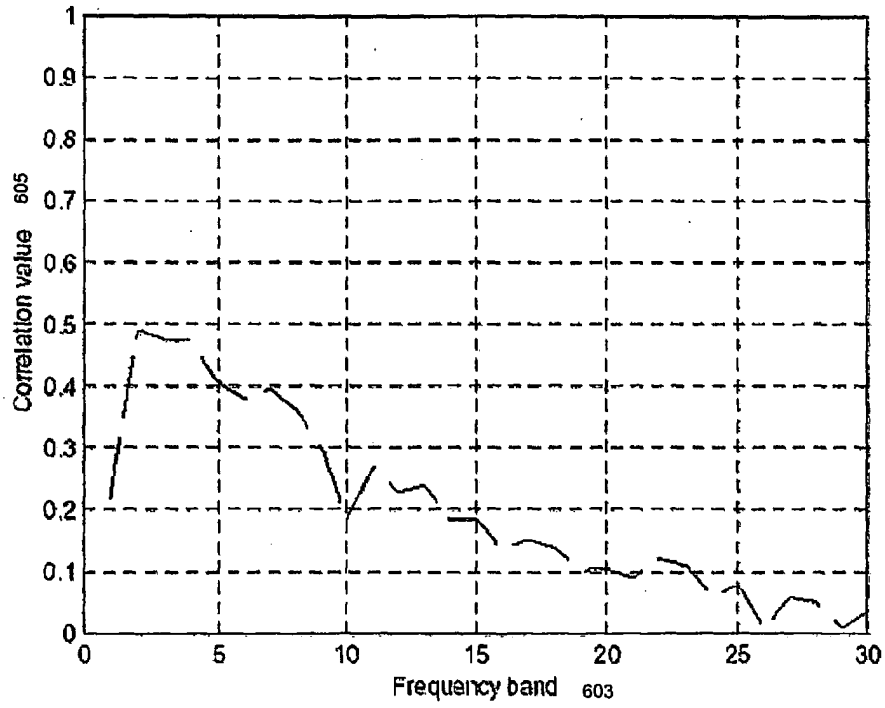


502



503

Fig. 5


1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Correlation value 605
0
5
10
15
20
25
30
Frequency band 603

601

Fig. 6

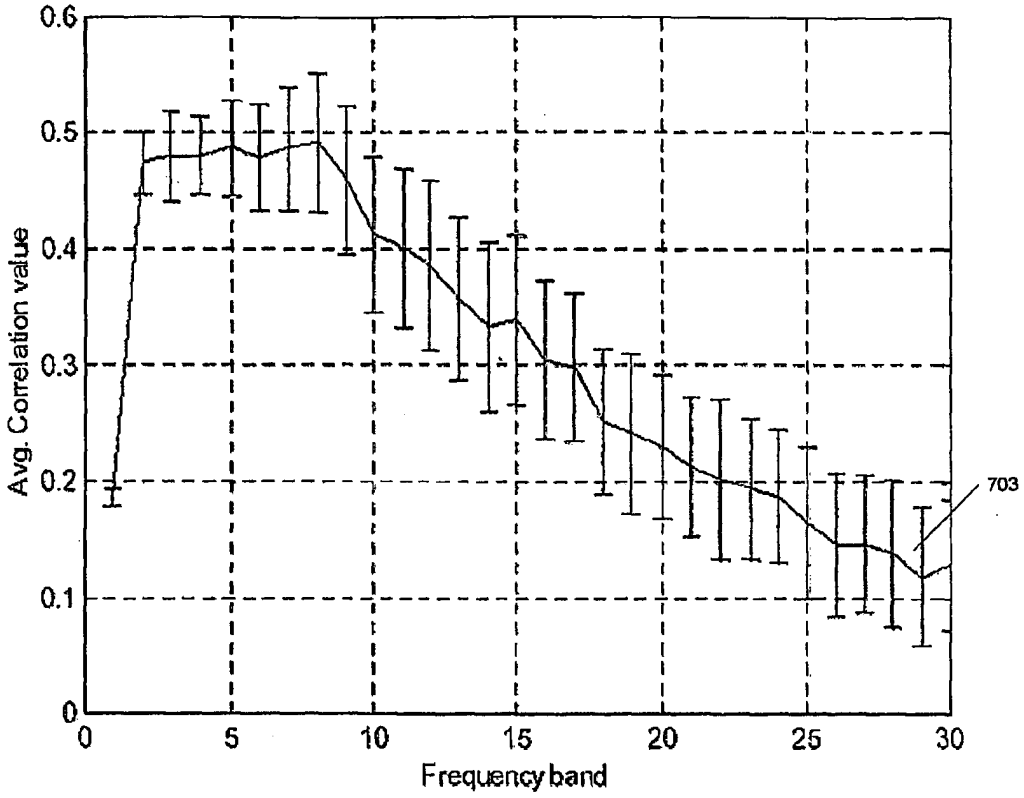

0.6
0.5
0.4
0.3
0.2
0.1
0
Avg. Correlation value
0
5
10
15
20
25
30
Frequency band
703
701

Fig. 7

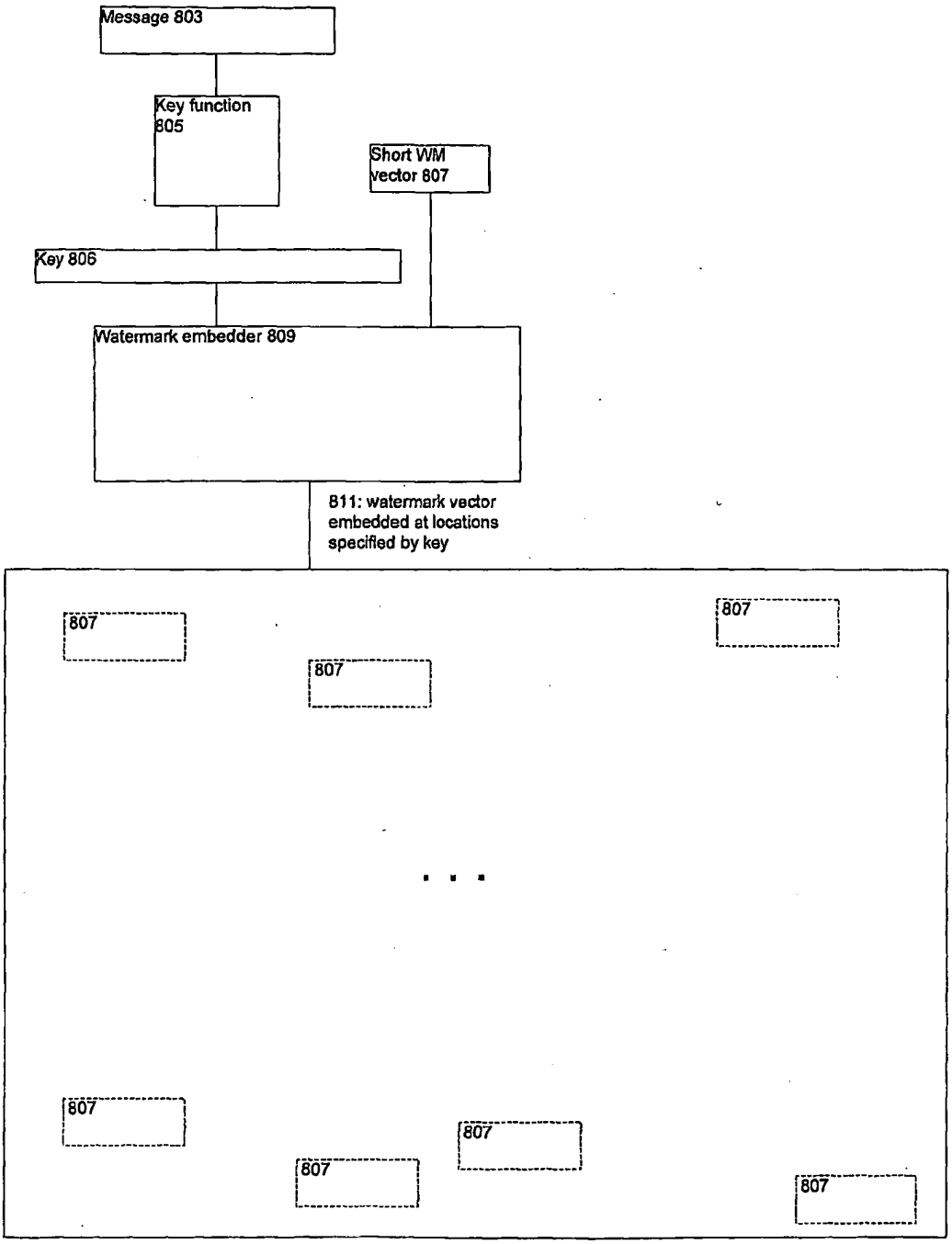
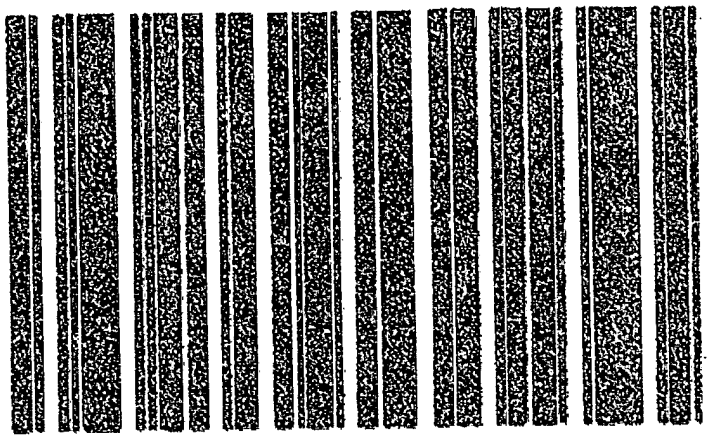
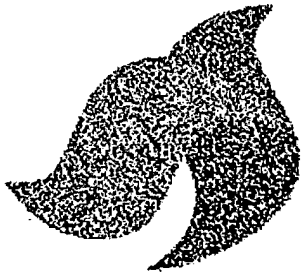

Message 803
Key function 805
Short WM vector 807
Key 806
Watermark embedder 809
811: watermark vector embedded at locations specified by key
807
807
807
807
807
807
807
Watermarked digital representation 813
801

FIG. 8

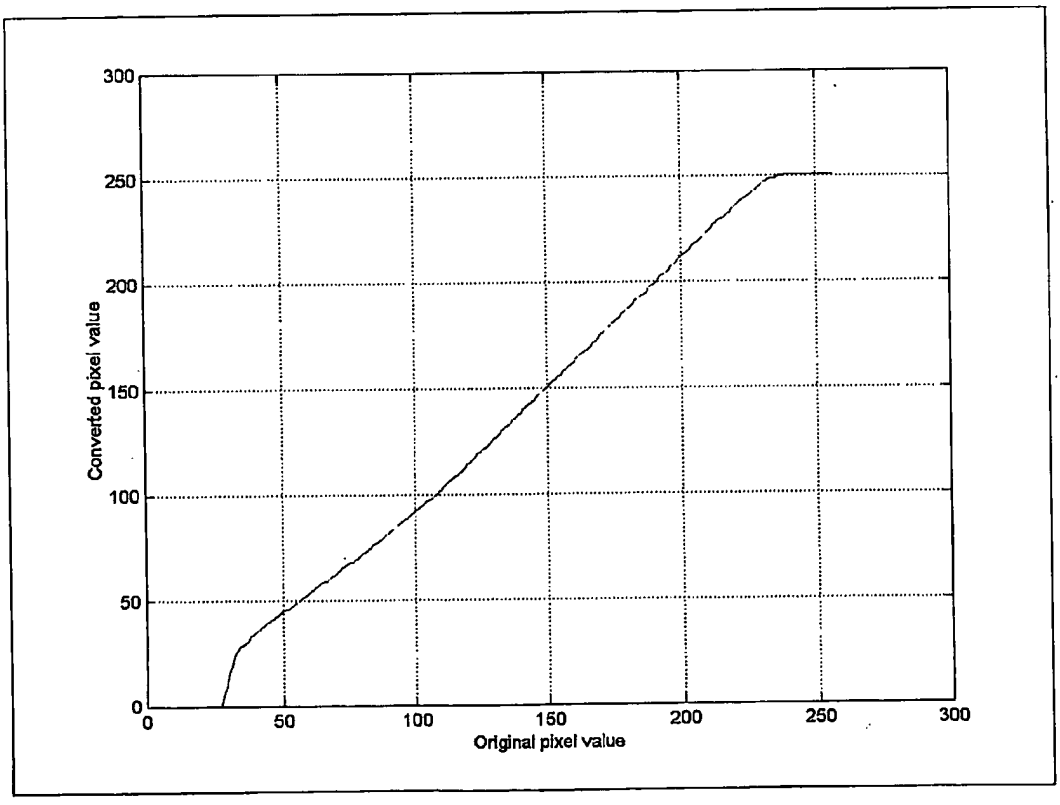


901



903

Fig. 9


300
250
200
150
100
50
0
Converted pixel value
0
50
100
150
200
250
300
Original pixel value

1001

Fig. 10

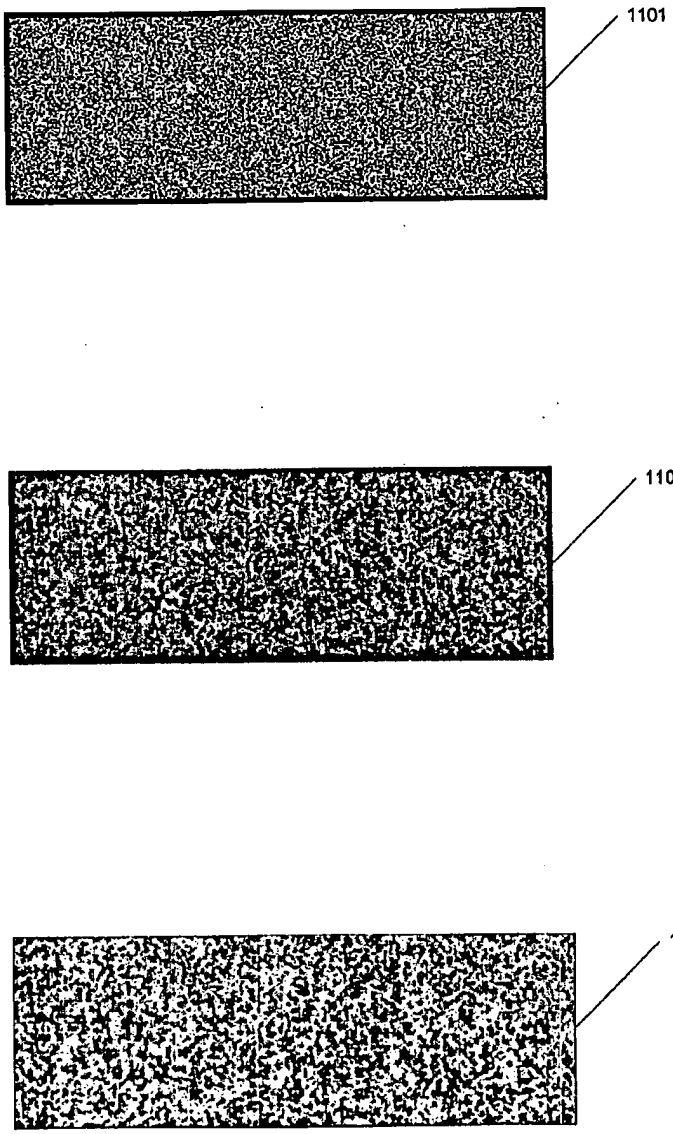


Fig. 11

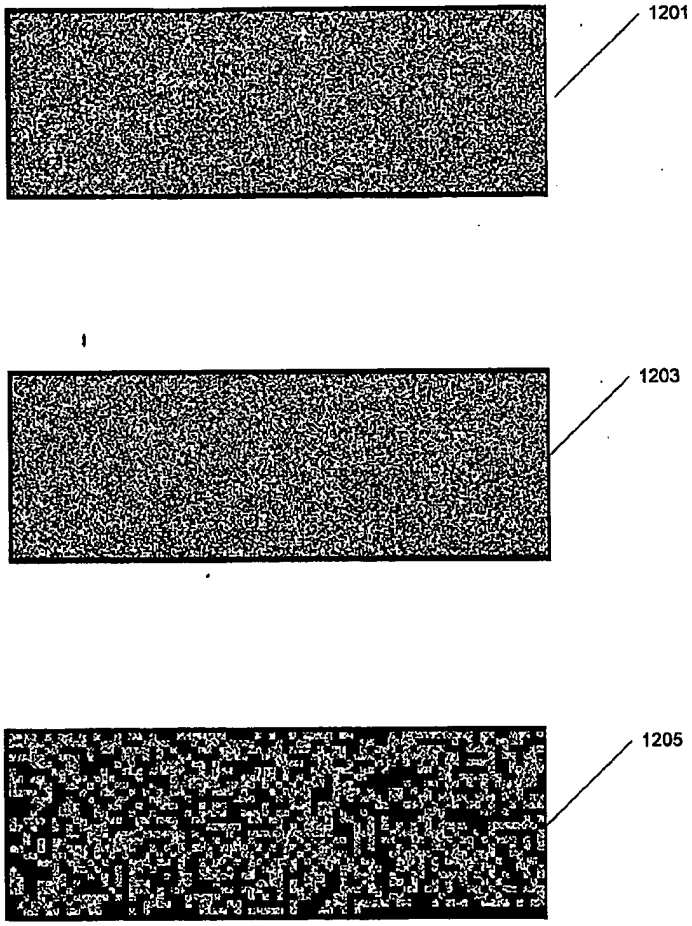
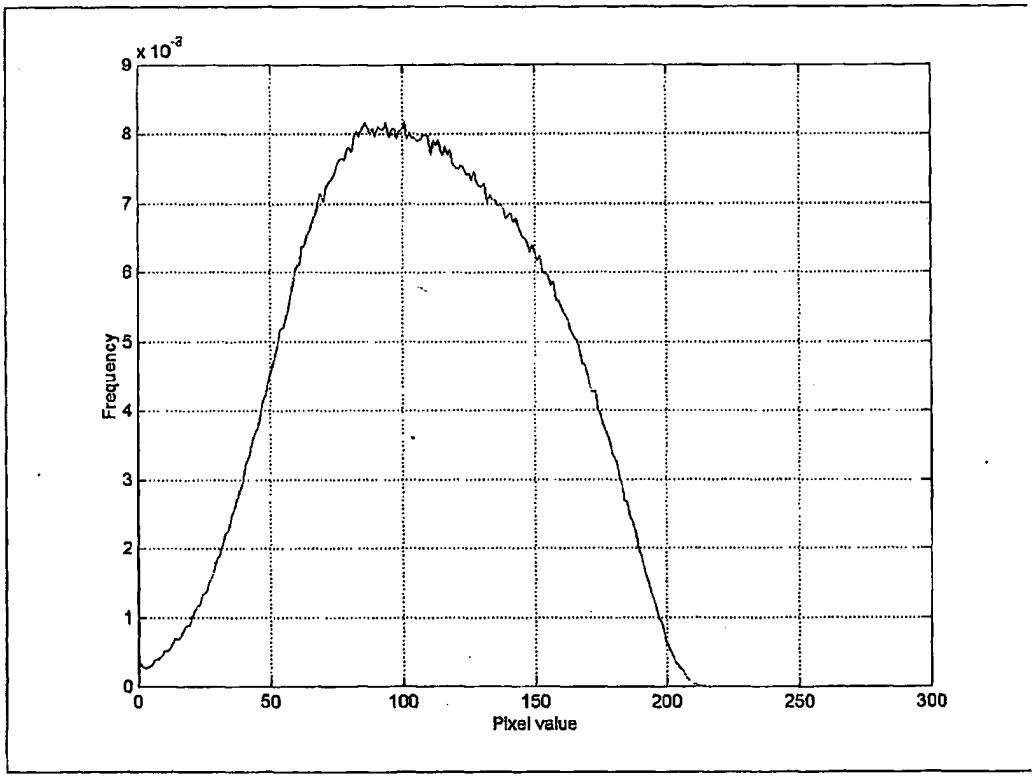


Fig. 12


x 10^-3
9
8
7
6
5
4
3
2
1
0
Frequency
0
50
100
150
200
250
300
Pixel value

1301

Fig. 13

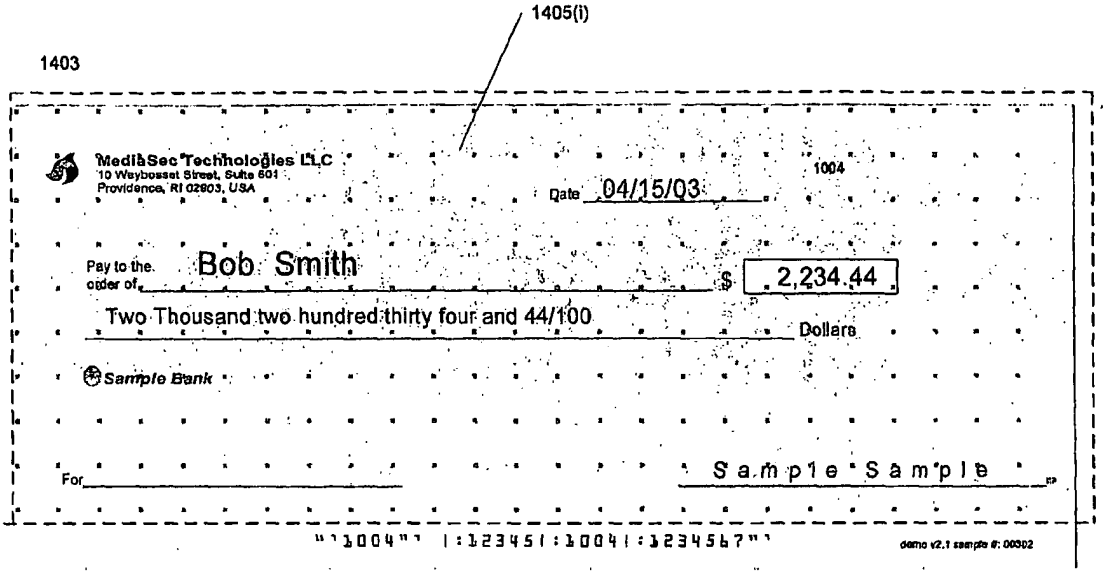

1405(i)
1403
MediaSec Technologies LLC
10 Weybosset Street, Suite 601
Providence, RI 02903, USA
1004
Date 04/15/03
Pay to the order of Bob Smith
$ 2,234.44
Two Thousand two hundred thirty four and 44/100
Dollars
Sample Bank
For
Sample Sample
⑈1004⑈ ⑆123451⑆1004⑆ 1234567⑈
demo v2.1 sample #: 00302
1401

Fig. 14

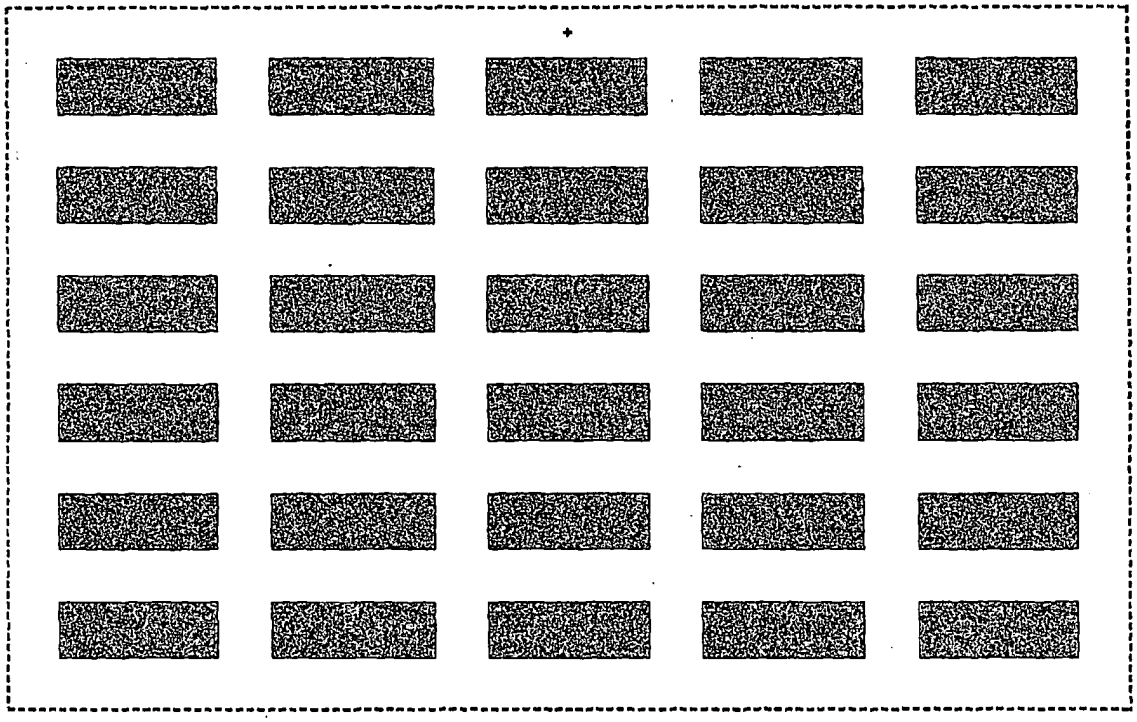
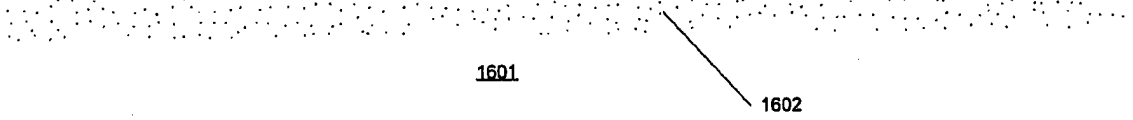
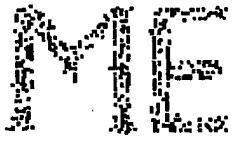


Fig. 15

Obviously, the multiple CDP digital image has to be printed on the printer that will be used in the application, with the same printing parameters, and has to be scanned with the scanner of the application, with the same parameters as well. Not observing this, or using the wrong threshold and parameters, may, may lead to a less reliable detection, if not to completely wrong results.





1603

Fig. 16

1701

243	228	210	236
59	195	114	189
155	117	158	45
124	5	203	104

1702

12	27	45	19
196	60	141	66
100	138	97	210
131	250	52	151

1703

44	36	24	10
198	20	167	83
97	159	135	198
106	299	10	172

Fig. 17

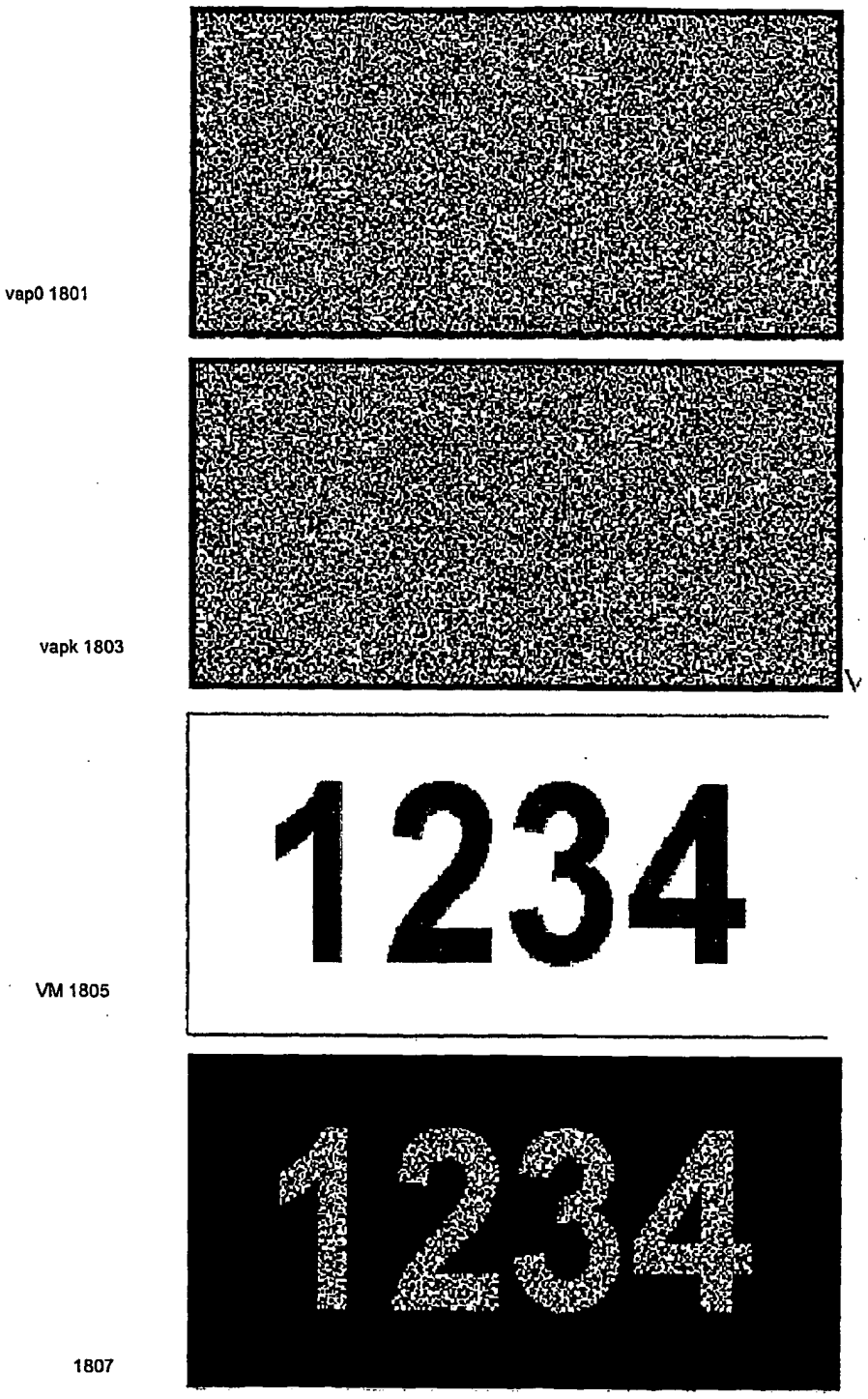


Fig. 18